Professional Development

the CANNON

Tuesday, November 3 | University of Toronto Engineering Society | Vol. IV No. 3

Chems in Conference

hy John Voss
Chem Eng 8T2

More than fifty students from the Faculty's fourth year Chemical Engineering class travelled to Montreal early last month to attend the Second World Congress of Chemical Engineering.

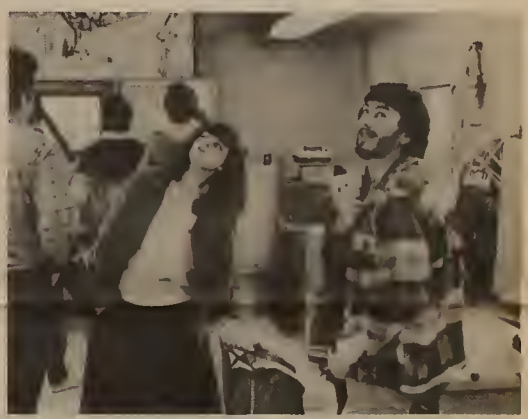
The Congress was held Octoher 5-9 and coincided with the Thirty-first Canadian Chemical Engineering Conference, the Ninth InterAmerican Congress of Chemical Engineering and the World Chemical Exposition. In all, 3000 delegates from fifty-seven countries attended the Congress, as well as 800 students.

The U of T students enjoyed the rare opportunity to meet students from across Canada, as well as France, the U.S., Finland, Venezuela, and the U.K. The contingent of Mesican students numhered around 200.

The Congress theme was "Chemical Engineering for World Development". More than 1000 technical papers were presented over the four days. These covered the traditional areas of Chemical engineering suck as transport phenomena, thermodynamics and kinetics, rheology and fluid mechanics and the like. Others dealt more directly with the theme, with topics such as the economic and technological outlook for the chemical process industries, technology transfer to the developing world, and the international practice of chemical engineering.

Ahout eighty-five representatives from the manufacturing and service sectors of the chemical industries put their products and services on display at the World Chemical Exposition. Some of tbe Toronto students expressed pleasant surprise at the willingness of these industry representatives to explain their technologies to the students who, as one student put it, "had no money to spend". In fact, the Toronto students gained a hit of a reputation among the exhihitors hecause of the numher and type of questions they were asking. Fourth year cbemical engineers take a Plant Design course which requires them to plan and design a full-scale chemical plant. The Congress provided these students an ideal opportunity to gain information on the type of products available today, and how they are used.

Despite some trepidation over the work required to catch up on a week of missed lectures, the Toronto delgates expressed their satisfaction with the Congress. It wa̅s a rare and successful opportunity to sample the chemical engineering profession on a glohal scale.



UofT was represented at all conferences this month: at RESSA (pictured above), the APEO conference (ongoing at time of printing) and the Chemical Engineering Confernce in Montreal.

PEYing your way through Skule

hy Gus Rinella
MMS Eng 8T5

Despite their having chosen engineering as their course of study, many students are unaware of the responsihilities and day to day duties of the practicing professional. The Faculty of Applied Science and Engineering has introduced a series of lectures to try and answer some of the questions in this area. However there still remains a segment of the student body that is still unsure. The Professional Experience Year (PEY) program is the way that an increasing number of students choose to satisfy tbeir curiosity.

The PEY program was introduced two years ago in order to provide students with a chance to work in an engineering field for sixteen months hetween their second and third years. This arrangement allows for the student to work in a firm for a longer period of time than most summer johs would allow. The student is then able to tackle a more challenging job or to do a joh in greater depth, an option tbat is more rewarding for hoth the employer and the student.

The program hegan in Mechanical Engineering under the auspices of Prof. D. McCammond and has expanded to include the otber departments with Dr. McCammond acting as coordinator. The program still remains most popular with Mechanical engineering students, having ahout ten students involved, hut three Electrical, a pair of Civil and one Industrial student participated last year. It is hoped that the program will continue to grow until ahout ten percent of the students in engineering are involved. Students may end up working for firms such as Atomic Energy of Canada Limited in research, General Motors in production, or DeHavilland Aircraft in design.

While the program is still young (the first PEY students are graduating this year) several comments keep cropping up ahout it. It had been feared tbat the students, upon returning, would suffer academically. Such has not been tbe case, for most come hack more motivated and mature and some have found an increase in their performance. The companies involved have reported good experiences with the program since it allows them to have a close look at prospective permanent employees under actual working conditions. Some PEY students were offered further summer employment; one can expect at least a few permanent offers directed towards a PEY student.

The students reported that they tended to get more challenging johs than those on cooperative work terms since they were there for longer periods of time. They also mentioned that they had a good insight into the company's method of operations and were hetter prepared to decide as to whether or not to work for the firm again. Many students also discovered tbat design was not tbe dominant form of work hut that testing, report writing and other activities occupied much of their time. The students also found that in many instances tbey did not know how to do the job hut learned quickly how to access the expertise around them.

In conclusion, it can he said that while the program might not be for everyone, it can provide valuahle in-depth experience in the engineering environment, in addition to paying next year's tuition.

This Month

the CANNON

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THE CANNON is a publication of the University of Toronto Engineering Society. It is published monthly to announce Eng. Soc. events, discuss Faculty and University matters, and present technical information of interest to Engineering undergraduates. Subscriptions are available, call Ella at 978-2917. Anyone interested in helping with THE CANNON is most welcome.

THE CANNON encourages submissions; please type or write legibly. Deadline for articles is one week before publication date, notices and letters by 5:00 p.m. the Friday prior to publication. Comments on THE CANNON or articles appearing in it are appreciated. The editors reserve the right to edit letters for brevity.

Presenting the first ever

Engineering Alumni Athlete Award

This award is presented hi-monthly to an Engineering Undergraduate for their high involvement and outstanding performance in intramural athletics. Nomination forms are availahle from Ella in the Engineering Society offices.

Photo by Ben Poblete

B. Marler presenting the first Engineering Alumni Athlete Diane McCurdy with their award.

B. Marler is a graduate of Eng. Sci. 7T9, and has served on the Engineering Alumni Council since 1979. He is presently in charge of Undergraduate Relations, which involves coordinating all Alumni sponsored undergraduate activities.

Diane McCurdy (Chem 8T2) has heen chosen Athlete of the Month due to her agressive and consistent teamwork as the Women's soccer team centre forward. For her effort, especially in muddy conditions, she has earned the prestigious title of 'Pig Pen II'. Diane also plays hockey, volleyball, squash, and hadminton for Skule.

Time for Engineering

We, the engineering students at U of T, often pride ourselves on our high standards, excellence of staff and high quality of graduating students. But hecause many spend so much time engrossed in their studies, students are missing many opportunities to develop themselves as engineers.

For example, the U of T will he hosting this year's Ontario Engineering Design Competition. Entering this is a golden opportunity for students to show their technical ahility by solving a real corporate problem, designing an innovative product or addressing an engineering policy. Besides the cash prizes and trophies for the winners, those entering the competition gain the henefits of working with practical devices making themselves more employahle. Remembher that many of the judges are industrial leaders.

Secondly, note the size of this issue of *the CANNON*. See that it is only four pages due to the lack of any technical content. Research is going on at U of T; we have all seen the budget allocations. But you could never guess such from the pages of *the CANNON*. *the CANNON* is read hy faculty, undergraduate and graduate students. By writing, not only do you gain notoriety, hut everyone gets a hetter idea of the technical climate at the U of T.

Please take a small portion of one day to write a short article perhaps on what you are currently doing (if you are a grad student) or some engineering topic you are familiar with. Feature technical articles (4-5 typed pages) are also welcome. Five such feature suhmissions would be enough for *Engineering Forum* for the remainder of this year, but five is a distant goal when none have been submitted to date.

Athletics

Engineers Dominate

by June Li
Chem Eng 8T2

The fall season is drawing to a close and playoffs have hegun. Once again, many Engineering teams have made it to the playoffs and appear to have good chances of taking the titles in several sports.

The Rugger A team finished its season last week with 3 wins and 3 loses. Later this week, they will he challenging Trinity and the team is confident that they will win. Rugger B, as of last Friday, had not yet finished its season and has a chance of making the playoffs. This second team is a new team. Considering their inexperience, the team has done very well.

Both the Senior and Junior men's soccer teams will make the playoffs with records of 1:1:4 and 3:2:1 respectively. The Senior Engineering team, presently in second place, is a hig improvement over last year.

On Octoher 16, the men's Engineering Track and Field team placed second in the interfaculty meet. Ken Talhot, Howard Iu, and John Wong each placed in the top two in three events. Engineering won the 4x100m relay, 1500m, and 800m races.

The Women's soccer team finished its regular season with a 5:1:0 record and is in first place in their division. The turnout has heen very good considering the numher of games played at 7:30 a.m. and in one inch mud with pouring rain. With only 3 returning players, the touch foothall team has had a disappointing season with 3 losses and 2 ties. However, a numher of first and second year students came out, which gives them a good reason for next year's team.

Coming up soon on Novemher 16 is the women's swim meet. If you can float, sign up! The women's volleyhall season does not hegin until next term hut there will he a pre-season tournament from November 9 to 19. Since there is hoth a competitive and recreational league, this tournament will allow you to decide which league you would like to play in. Three teams have heen entered: two recreational and one competitive. You can sign-up until the lists are taken down.

Engineering football is only one of the sports underway this fall.

The men's squash team sign-up meeting was on Octoher 30. If you missed it, contact the squash commissioner, Boh Bowden (677-3705).

Men's volleyhall does not start until next year hut practices have hegun. Four or five teams were entered. In hockey, Skule once again dominates the scene with two competitive teams and twenty reacreational teams.

In co-ed sports, volleyball ends today, hroomhall hegan last week and inner-tuhe waterpolo starts next week. Co-ed sports are truly recreational since there are no scores, standings or playoffs. If all you want is fun, sign-up for co-ed sports.

At noon on Thursday, Novemher 5, there will be a meeting regarding yearbook pictures, write-ups and game sheets. A representative from each team (coach or manager) is asked to attend, as well as the commissioners for the sports which have not yet started. If you cannot attend, leave your name, number and sport in the EAA president's mailhox at the Engineering Stores.

Situations and Solutions

The following is a transcript of the speech delivered by President James Ham on October 13 at the first lecture in a series sponsored by the Professional Development Committee. The committee hopes to have three more lectures discussing the engineering profession with the speakers being noteworthy and interesting to engineering students.

I wish to discuss briefly certain situational aspects of decision making, risk, and regulation that are akin to the more theoretic uses of these words in the study of engineering. These are philosophical views about the human condition. The verb "to control" is recorded in the Oxford English Dictionary as having entered the tongue in the year 1475 with the meaning directing and checking action. Words such as state as in state space, observability, controlability, reachable sets are others that have precise meaning to you but broader situational meanings which I intend to draw on possibly to your annoyance.

One of the roots of our social unease is that we have come to see the world too much in terms of sets of technical problems to be solved and too little in terms of situations to be transformed indeed perhaps redeemed. We have an overdeveloped solution mentality. In making this remark I do not dissent from Henri Poincare's dictum that there is nothing more practical than a good theory, if indeed it is a good one. Let me distinguish situations from problems in terms of the following response of an attractive young French woman who was bikini clad and sunbathing on a beach of the Cote d'Azur. She was being intently surveyed by a group of sailors, engineers no doubt, for you will recall that Hephaistos, the sole engineer among the Greek gods, married Aphrodite. A passing naval officer on observing the circumstance asked the sunbather if she felt she could solve the problem She replied — "Monsieur, I recognize the situation but I do not understand what you consider to be the problem." Situations relate to the human condition, to intents and purposes, personal, corporate, civic, to the human context of one's work in university department, to the quality of one's relations with graduate students, to the relation of one's work to its field, to its industrial utilization, to the risks and opportunities that suck use introduce into the human adventure.

I want to argue that the engineer who is truly professional is he or she who is sensitive to the situational contexts in which problem formulation and solving is undertaken. I shall later argue that situations inherently involve risks and to be a professional always means to accept a measure of responsibility for the risks of situations. To accept responsibility for risks means to have commitment and to display leadership. Engineering education today does not engender the sense of responsibility that it ought to. The professions are not giving the quality of leadership they should.

To pursue my thoughts further I want to restate the fundamental difference between science and technology. Science is an expression of our will to know, a searching out of what is general in what is particular. It enriches our minds and the basis for our perceptions of creation. Technology is an expression of our will to contrive, a purposeful searching out of something particular within the general possibilities bounded by our scientific knowledge, human experience and skills. Indeed Leonardo da Vinci expressed the character of contriving in these words: "Where nature finishes producing its shapes, there man begins, with natural things and with the help of nature itself, to create infinite varieties of shapes".

It is important to remind ourselves as Michael Polanyi has so lucidly donè in his book, *Personal Knowledge*, that all technological artefacts including all specific application of servomechanisms, regulators and optimal control systems embody operational principles which are not accountable for in terms of physics and chemistry. Operational principles of devices are, to use Polanyi's term, *rules of rightness* which can account only for the successful working of systems but leave their failures entirely unexplained. Thus physics and chemistry and indeed mathematics cannot be used to decide that the object that you are sitting on is a chair but they may be used to examine causes of its collapse. The design of technological contrivances which is so often undertaken with a problem solving mentality and which expresses the underlying human will to contrive always expresses purpose, and human purposes inherently place contrivances in a situational context.

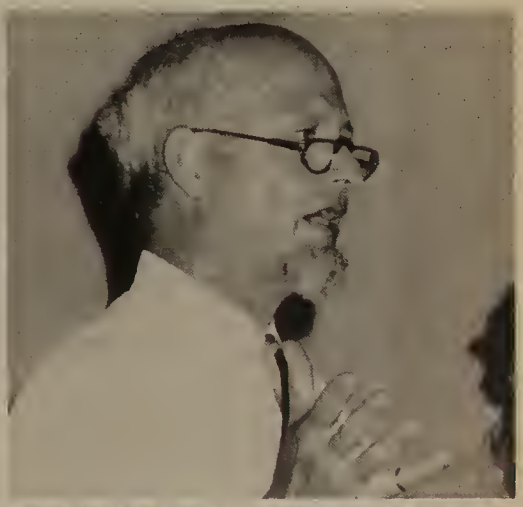
Technology is therefore not morally neutral, it is illuminated or stained with the will and aspiration of those who control it. Let me illustrate. The concept of energy as something to be contrived, transported and sold as a commodity emerged with the steam engine. In March 1776, just two hundred odd years ago James Boswell, the alter ego of Samuel Johnson, stood beside Matthew Boulton at the great Soho works near Birmingham where a steam engine of Watt's design was in production. Boulton was the entrepreneur-associate of Watt. Boswell records that Boulton gave an unforgettably succinct statement of his purpose when he turned to him an said, "I sell here, sir, what all the world desires to have—Power". We should not delude ourselves that technology is morally neutral and I do not, God forhid, argue that it is had. Jurgen Habermas has said that, "Technology is always an historical-social project: in it is projected what a society and its ruling interests intend to do with men and things". Having a few years ago conducted a Royal Commission into the Occupational Health and Safety of Workers in Mines I have a deeper sense of the paradoxes of situations and solutions.

I want to conclude these remarks hy pointing to one of the most disturbing paradoxes of out times, namely the paradox of regulation and risk avoidance. The affluence that we enjoy derives basically from the technological surplus (profit if you wish) achievable through man's will to contrive. It was the operational principle of crop rotation over three fields and the invention and use of the heavy iron prough drawn by teams of oxen that enabled the medieval world to achieve a surplus that permitted it to build cathedrals and to found uiversities. To contrive is to introduce risks and opportunity into the human adventure. Risks to nations, economies, occupations and citizens are recorded in history. The canon destroyed the robustness of feudalism and modern transportation, telecommunications and control have irrevecably knit the world into a radically interdependent and quasi-stable place.

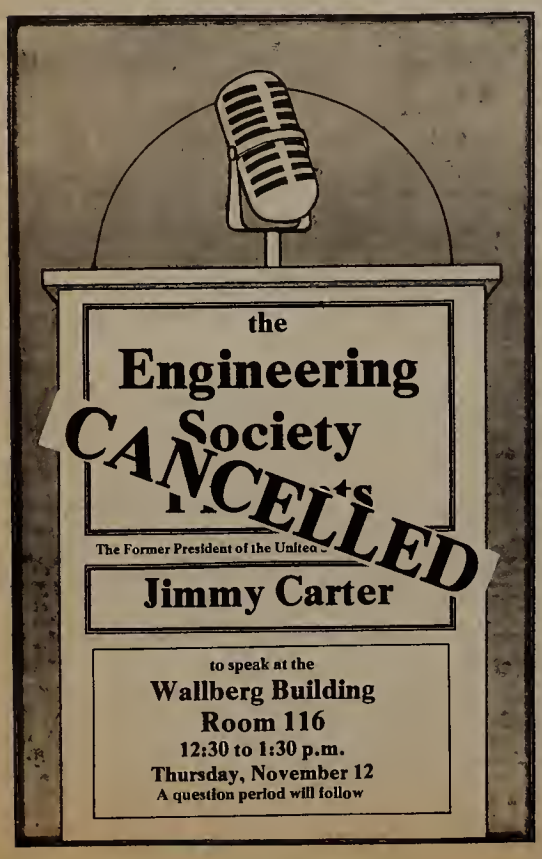
In this continent most of us have open-ended expectations of lifestyle; we have a subconscious sense of unattained yet reachahle sets of personal state. This freedom of lifestyle is accompanied hy voluntarily imposed risks which, for example, in the case of cigarette smoking are simply horrendous. At the same time socially we are increasingly adamant that others than ourselves and in particular businesses, industries, manufacturers, and neighbours should not impose risks on us. As Chauncey Starr has said, "We are loathe to have others do unto us what we will happily do unto ourselves". We have become a risk avoiding rather than risk embracing society with the consequence that openly claimed freedom of lifestyle is bounded by masses of regulations predicated on the absurd conviction that we can create a risk free society, hy insisting on accountahility to proliferating regulations stimulated by a burgeoning litigiousness. A risk avoiding society is one that loses its confidence to embrace responsibly opportunities as well as risks. Our litigiousness is a symptom of unease about our purposes and of civic ignorance about the risks and opportunities that are inherent to the decisions we make in expressing our will to contrive. For example, control systems as part of our contrivances express corporate purposes, contribute to civic risks and create new situations in our society. History develops as a series of situations under continuous transformation and has no solutions, much less a fail safe or asymptotically stable one. The robustness of our civic affairs is not clear. The sharp analytical edge of control theory is an essential instrumentality for examing local processes but no change of scale or scope fits such an instrument to comprehend the human situation.

I conclude with an exhortation to you to assume responsihility for the situational and therefore purposeful and civic context of your work, in assuming than responsibility to define and emhrace the risks that are inherent to it and hence to display the wisdom and give the leadership that is so lacking in our troubled times. Northrop Frye, one of the literary scholars of world stature at the University of Toronto has said that, "Knowledge is knowledge of something; wisdom is a sense of the potential rather than the actual, a practical knowledge ready to meet whatever eventualities may occur, rather than a specific knowledge of this or that subject". To give leadership means to have perspective on one's part of the human condition.

Let me close hy illustrating what I mean by perspective. An Irish gentleman had just received a brand new Mercedes Benz and was testing its capabilities on a narrow rural road. As he rounded a corner, two farmers seated on a hay cart drove out of a field directly on to the road. He slammed on the brakes and fought for control and managed to skid into the field from whence the cart had come, and barely succeeded in slewing down the field and out the next gate hack on to the road. As the farmers ohserved this situation and pondered on it, one turned to the other and said, "By Jesus, we got out of that field just in time!"



One of the most distinguished of the Sons and Danghters of Martha, U of T President James Ham discusses the profession of Engineering.



Engineering This Month

Wednesday, Novemher 4
Centennial Committee
There will be a centennial committee meeting at 12:00 noon in the Engineering Stores. Those interested in organizing preparations to celebrate the 100th anniversary of the Engineering Society in 1985 are urged to attend.

Thursday, November 5
Engineering Athletic Association
There is a meeting at 12:00 noon at the rear of the Stores regarding yearhook pictures, etc. A representative (coach or manager) from each team is asked to attend as well as commissioners for spring sports.

Friday, Novemher 6
Toike Make-Up
The LGMB, BFC, Skule Niters and all Toike staff will be working on the all-new-old-God-Knows-what-next-last-edition-hefore-Christmas issue. Unofficially, rumour has it that several Toike editors and layout experts from the Golden Age will he in attendence. Come out to the Engineering Stores from 5:00 p.m. for free sustenence and libation to make this a truly memorahle edition.

Saturday, November 7
Engineering Car Rally
For all of those not driven up the wall by school work, this is your chance to do it yourself (so to speak). The rally starts at 12:00 noon at Convocation Hall. You should have signed *up by now.*

Tuesday, November 10
Eng Soc Executive Meeting
Engineering Society will meet at 5:00 p.m. at a place to he announced. There is a finite probability that refreshments will be served. Please be prompt; if you can't attend, send a proxy.

Tuesday, Novemher 10
Wednesday, Novemher 11
Thursday, November 12
Skule Nite Auditions
For all you hudding actors and actresses, here is your chance. Auditions will take place from 6:30 to 9:30 in the Engineering Stores. Experience is not necessary, nor is talent. All you need is enthusiasm and a hurning desire to participate in the hest annual comedy revue on campus.

Tuesday, November 17
Fourth Year Employment Seminar
The Engineering Alumni Association is sponsoring an employment seminar for all fourth year students. The topic will he joh strategies and will feature guest speakers to advise and aid the class of 8T2 in their job decisions. An exact time and place have yet to he confirmed, and the date itself is tentative. Keep an eye out for further detatils. Refreshments will he served.

Friday, Novemher 20
OEDC Deadline
For those interested in entering the Ontario Engineering Design Competition, today is the deadline for all 4 categories: entrepreneurial design, corporate design, editorial communication and explanatory communication. Leave your application with Ella in the Stores.

Tuesday, November 24
Full Council Meeting
Once again, the Engineering Society and Faculty Council student representatives will meet to determine the fate of the Engineering Society. The meeting starts at 5:00 p.m. in GB 202. Perrier will not he served.

Oh my God, it's...it's...it's...it's...it's...it's...it's...

SKULE NITE
Auditions
November 10, 11, 12
6:30 to 9:30
Engineering Stores

Summer Jobs

Brunswick Mining and Smelting Corporation. Chemical and Mechanical engineers, hoth third and fourth years. Application deadline is Novemher 4 at closing time.

Gold Fields Mining Corporation. Geological engineers, second, third and fourth years. Apply on or hefore Novemher 4.

National Research Council. Honour students in science and engineering for various positions across Canada. Apply before Novemher 21.

Atomic Energy Board of Canada. Students in hiology, chemistry, physics, engineering, mathematics, and computer science, either third years, graduates or post graduates continuing their studies. Deadline for applications is Novemher 30, 1981.

Eng Soc Opportunity

The postition of Engineering Society **Publications Business Manager** is now open. Responsibilities would include contact with advertisers, and the preparation of ad copy for publication. The Business Manager will be paid a commission for each ad secured. No experience required. Submit questions or applications to John Voss, Vice President: Administration.